XSNet 1800 SW

(Firmware v.3)

Field-hardened layer-2 Ethernet switch with 2 optical 100Mbit uplinks + 4 10/100Base-T ports

USER MANUAL

Version 1.0a (060604-1a)
XSNet1800SWv3 (MW03SP2)

Table of Contents

PLEASE READ THE DOCUMENT 'QUICK START' BEFORE INSTALLING THIS EQUIPMENT

XSNet 1800 SW v.3

Part I: description, features, hardware installation

1. General description

XSNet 1800 SW switches have four electrical Ethernet ports, and also provide up to two independent 100 Mbit optical uplinks through either dual multimode or dual single-mode fibres (one fibre pair per port), at wavelengths of 850 nm (MM), 1310 nm, or CWDM (SM), the latter for longer spans. Also available are medium-span models with one fibre per optical port. The switch is built as a platform: for its uplink ports, it uses SFP (Small Form factor Pluggable) packages. The units are especially suitable for use in outdoor housings.
The non-blocking, highly configurable switches support the following protocols: ARP, LLC, IP, UDP, IGMP, Spanning Tree (STP) and Rapid Spanning Tree (RSTP).
Front panel status LEDs provide information about power, port speed and port activity.
The switches come in the form of single-width (7TE) Eurocassettes fitting in MC 11 or similar power supply cabinets, or as stand-alone units (/SA option). Device configuration can be performed in-band using the built-in http server. In-band device and link management using a GUI can be performed with the aid of Optelecom-NKF utility programs based on the MX protocol. In an EB-2 type power supply cabinet, the switches can be configured and managed with the SNM protocol [variable by name protocol not implemented].

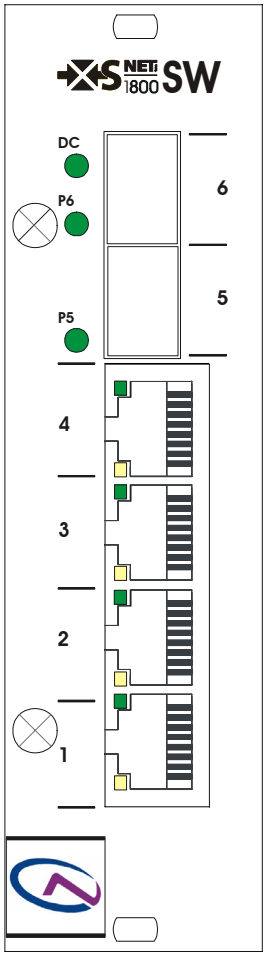


Figure 1. XSNet 1800 SW front panel

2. Front panel features

The 1800 SW front panel, shown in figure 1, has features as listed in table 1 below and represented in figure 1.

Feature		Function
Connectors		
Optical LC (dual), 5, 6		optical Ethernet ports
RJ45, jack, 4x (1-4)		10/100TX Ethernet ports
Status LEDs		
***DC**	green	DC power OK
***1-*4**	yellow	link speed 10 Mbit/s
	(upper)	blinking: data activity
	green	link speed 100 Mbit/s
	(lower)	blinking: data activity
	off	no connection
***P5**, ***P6**	green	green: sync OK blink: data activity off: no sync received

Table 1. Front panel connectors and indications

3. Installation

3.1. Initial configuration notes

Before installing and trying to link up the switch in a network, please read the separate guide detailing how to set the IP address and subnet mask, and if necessary the gateway address, for initial installation.

3.2. Hardware installation

A Eurocassette module will slot into an Optelecom-NKF power supply cabinet, model MC 11 or similar. A stand-alone model may be mounted in any suitable environment that will not make it overheat or malfunction in other respects: some natural air circulation, moisture lockout and prevention of dust or grime accumulation are always desirable.
The switch will power up in a few seconds, performing auto-negotiation on the 10/100 Mbit ports. The Spanning-Tree Protocol (if applicable) and Rapid Spanning-Tree protocol have convergence times of 10-30 and typically 4 seconds, respectively. Generally, the ports will all be up and running within a minute after powering up into a network.

3.3. Software installation

Only the items needed for putting the switch into operation, and some auxiliary features, will be described here.
With in-band configuration using the built-in HTML pages, the main switch parameters can be set. The following chapters contain a description of how to go about this.

XSNet 1800 SW

Part II: Configuration pages

1. Logging in

Logging in to the XSNet 1800 SW internal http server enables the user to configure the switch without using separate application software. A standard Web browser will suffice to find the module by its IP address.
Activate the **LOGIN** button on the login screen that will appear (see figure 1 below).

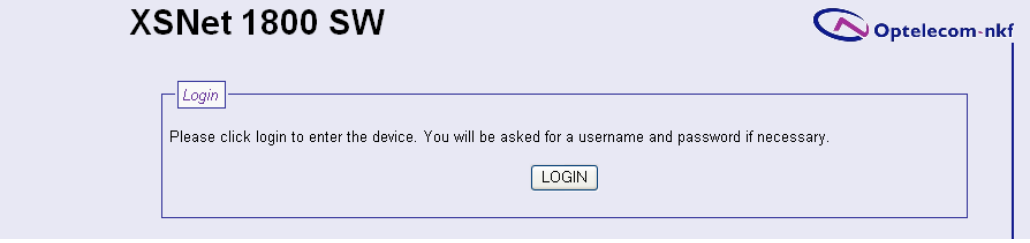


Figure 1. Part of the first screen: Login pane

After the Connect box appears (see below), a fresh module can be accessed as follows:

- login as ‘admin’
- leave the password field blank
- activate the OK button or press ‘Enter’

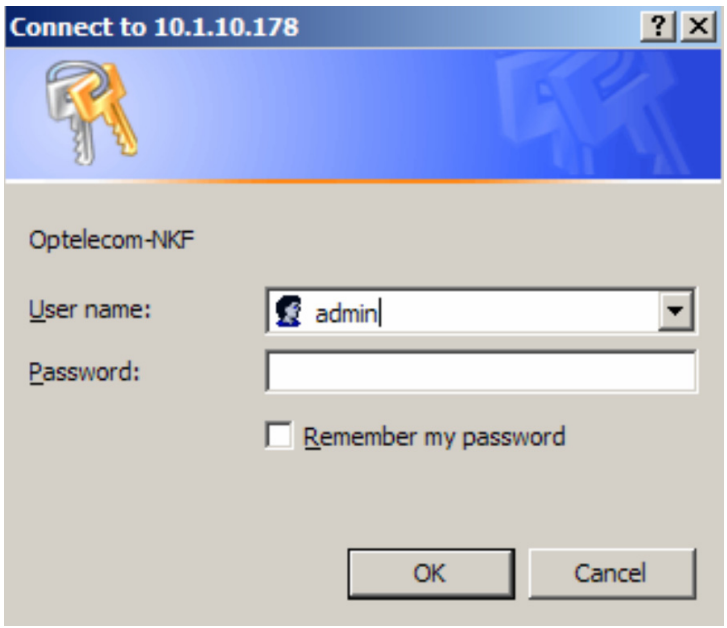
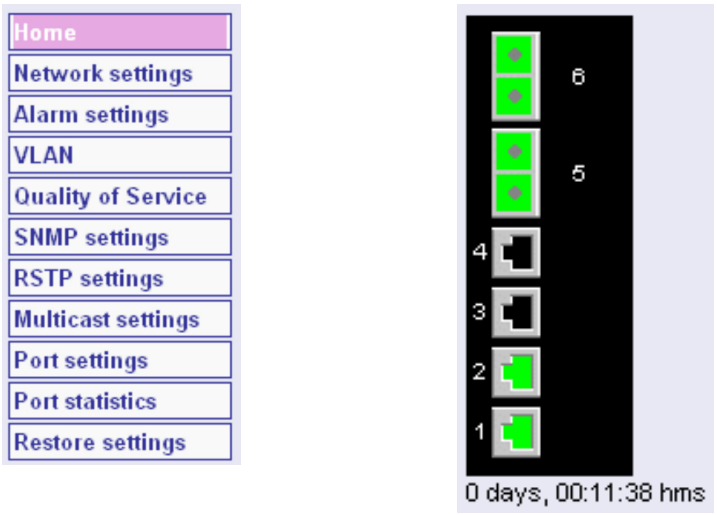


Figure 2. Login box

After completing login, the Home page (see the Homepage section) will appear.



Figures 3a,b. Page selection menu (left) and port connections

The other HTML pages can be called up next from the navigation menu appearing in the top left corner of each page (figure 3a); each page may consist of several sections. Each section has an information button , which can be activated to display help.

The HTML pages share the following features:

- a menu to access the pages (see figure 3a)
- a diagram (figure 3b) showing which ports are in use, i.e. connected to another active device
- panes (sections) showing parameter values, some of which are editable
- buttons, mainly **SAVE**, **REFRESH** and **CANCEL**, for sections with editable fields

Writing changes into the device after editing is done by activating the **SAVE** button.
The actual values still in the device are shown using the **REFRESH** button.
Activating **CANCEL** undoes any changes made before saving and shows the values as they were before editing.

Main operational variables and modes to be set are (see also figure 3a):

- Network addresses
- Port speed and mode
- Unicast and multicast
- RSTP (spanning tree/rapid spanning tree protocol) settings

2. XSNet 1800 Home page

This page (see figure 4) has the following sections:

- Identification pane: administrative data, including the article code, serial number, software version, and uptime
- Labels pane: label entries (editable)
- Status pane: an alarm status overview (alarms active or not), including the level of the highest occurring configured alarm (Module status field).

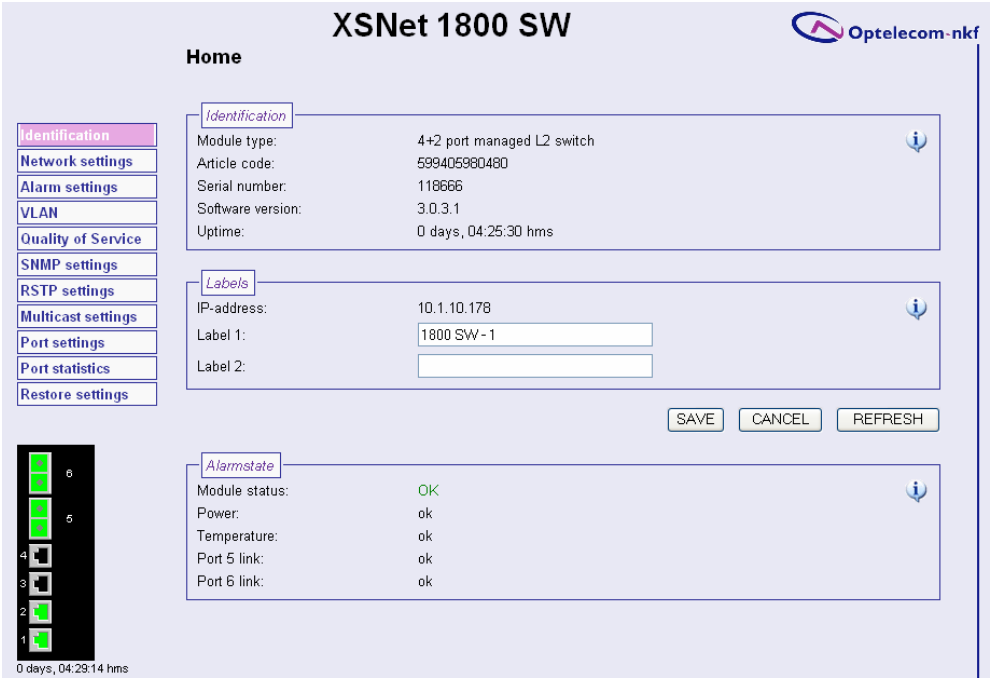


Figure 4. Home page, with Identification, Labels and Status sections

On this page, only the 32-character labels can be edited; please activate the **SAVE** button if after making changes you wish to make them definitive and active. However, if you decide to stop editing and return to view the original values, use either the **REFRESH** or the **CANCEL** button.
The Module status will be 'OK' if there is no configured alarm active (see the Alarms page); otherwise it could appear as a character from A-N, depending on the alarms configuration.

3. XSNet 1800 network settings

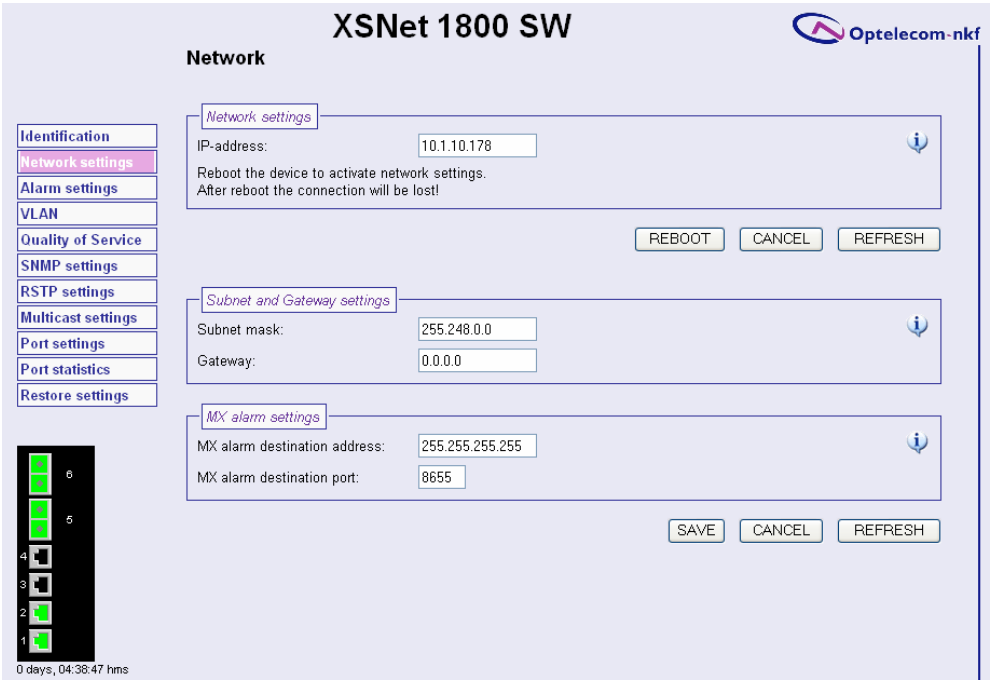


Figure 5. Network page

For correct functioning of the 1800 SW, it is essential to set its network addressing to be compatible with the subnet it is hooked into; see figure 5.
The Network settings pane shows the IP address. It is essential to set at least this address correctly and to keep the value on record, otherwise management of the switch will require special software. Note that the subnet address is also required.
After setting a new IP address, press the **REBOOT** button to activate the new setting. In-band communication with the 1800 SW will be interrupted and the user will have to contact the device again using the new IP address.

The Subnet and Gateway settings show the subnet mask and default gateway. Assuming the device IP address and subnet mask are already set correctly, only the default gateway needs to be defined in order to connect the network segment to others.

The entries in the MX alarm settings pane serve to support a video IP system using the MX protocol. The setting shown (255.255.255.255) indicates the MX packets are being broadcast.

After filling in the addresses, use the **SAVE** button to set them.

4. XSNet 1800 SW alarms

The Alarms settings page shows the Status and Alarm level settings panes. In the Status pane, the Module Status entry shows the highest level of the occurring and configured alarms, while the other fields in that pane represent the actual status of some alarms. These alarms are not necessarily assigned a level; this can be done in the pane 'Alarm level settings'.

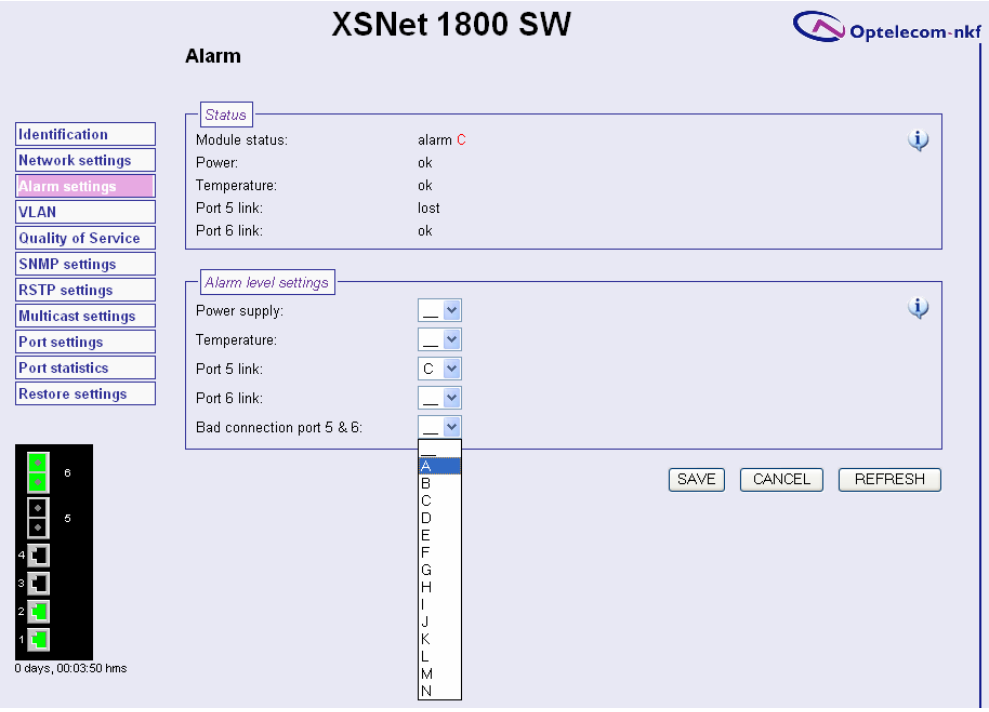


Figure 6. Switch alarms configuration page

Alarm levels can be set to A-N, or to '_' (equivalent to 'O'), the latter meaning no alarm level set. In the example screenshot, one alarm level was already set and another was in the process of being set. Setting an alarm level A-N also means the alarm will actually go off if a certain condition is met. For the 1800 SW, these conditions are:

Power supply alarm	Indicates an active power supply alarm (2V5 or 3V3 outside 5% of their nominal value)
Temperature alarm	Indicates an active temperature alarm (temperature above the selected value, default is 70°C)
Link loss alarm (port 5)	Indicates link of 100 Mbit port 5 is down
Link loss alarm (port 6)	Indicates link of 100 Mbit port 6 is down
Bad connection alarm (ports 5 & 6)	Indicates whether FX ports 5 and 6 together experienced more than 10 000 CRC errors (value can be changed using suitable software)

After setting an alarm level, first activate the **SAVE** button, then the **REFRESH** button to update other values displayed.

5. 1800 SW VLANs

XSNet 1800 switches support up to 50 virtual tagged LANs, organizing ports into separate groups. These VLANs are to be enabled from the VLAN Control menu with at least one entry in the VLAN Port Control menu, *and* a management VLAN defined. The latter is essential: without it, all in-band contact with the switch would be lost. *So: define a management VLAN first before enabling VLANs.*
The 802.1q tags can contain a VLAN ID and/or a priority level. If only the latter is present, the VID is zero; the frame is then called a 'P-frame' (priority-only frame) not to be confused with a pause frame.

VLAN entries: defining an 1800 SW tagged VLAN

On the VLAN Entries page, use the edit window (see figure 7) to fill in a row for each VLAN you want to define. For each port, two entries must be considered:

- the **port VLAN membership**, indicating that a port should be a member of the VLAN to be defined (membership of more than one VLAN is of course allowed)
- **untag** (i.e. remove Q-tags), indicating that tags holding VLAN and priority information should be removed from the output.
  For a port connected to another switch, there should be no untagging if the VLAN extends over several switches. For edge ports, the stream should generally be untagged.

A management computer should be connected to an untagging VLAN port unless the application running on it and the network interface card involved will handle Q-tags sensibly.

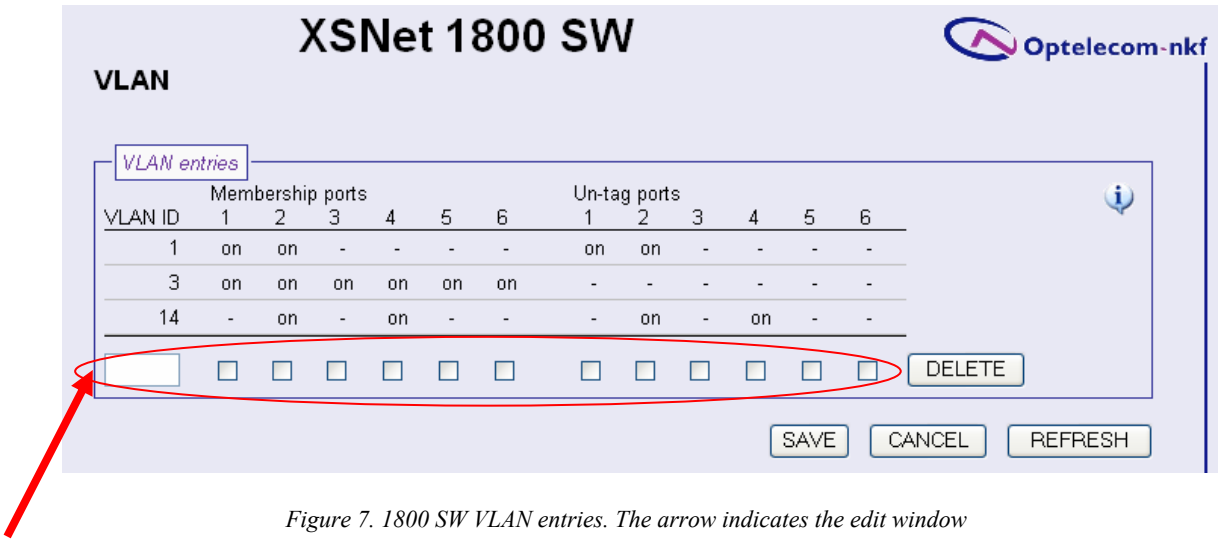


Figure 7. 1800 SW VLAN entries. The arrow indicates the edit window

By clicking on an existing VLAN entry, it can be edited in the edit window, indicated by the arrow. Pressing **SAVE** will consolidate the modified entry if the VLAN ID did not change, or add an entry if a new VLAN ID was added.
Pressing the **DELETE** button while an entry is present in the edit window will irrevocably disable and remove that VLAN.

Remember to use the **SAVE** button to store your VLAN definitions and settings.

Before enabling VLANs on the VLAN control page, be certain to fill in matching VLAN IDs in the VLAN Port Control pane there.

VLAN Control and VLAN Port Control

Before any entry on this page is made, the list on the VLAN Entries page must be filled in.

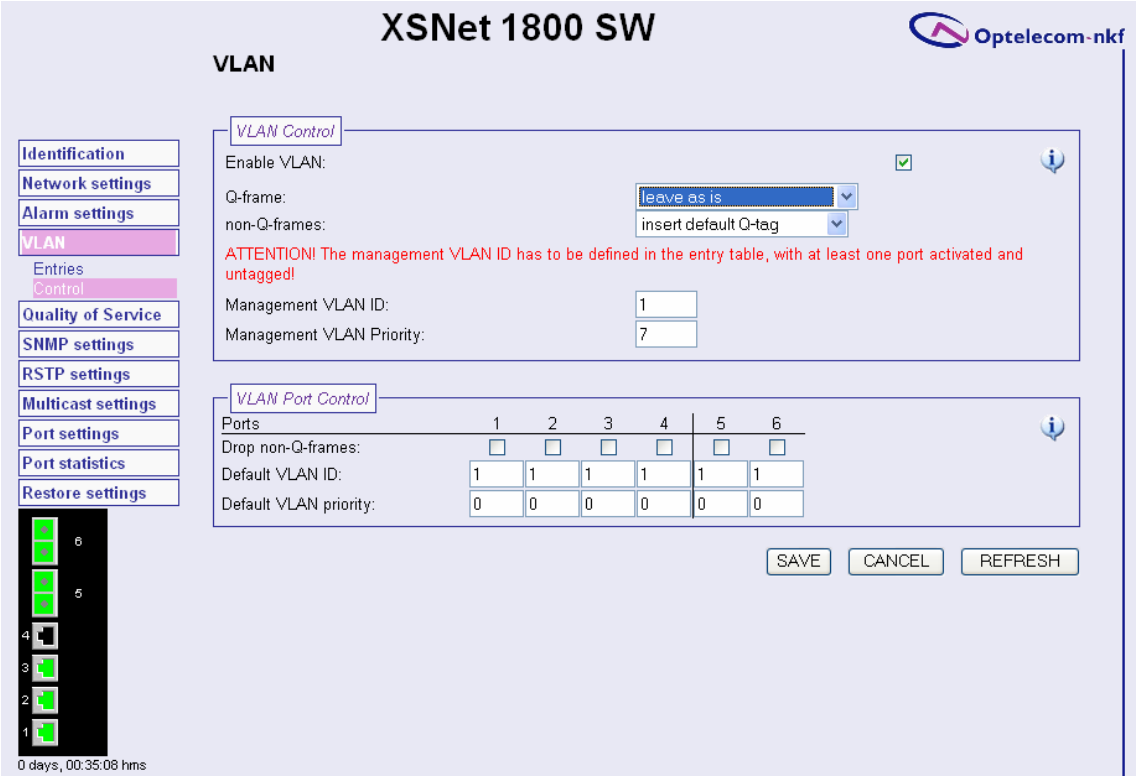


Figure 8. 1800 SW VLAN control and Port Control settings

If - in the VLAN Control pane - the VLAN Enable box is checked, it is possible to add, remove or modify Q-tags in packets, according to the ingress rules set in the VLAN **Port** Control pane (see figures 8 and 11).

If VLANs are enabled, the following ingress options are available:

- *incoming Q-tagged frames* can be modified as follows (see figure 9):

  - they can be left as they are
  - the VLAN ID can be changed
  - both VLAN ID and priority can be changed.

  This can be done with the 'Q-frame' selection box (see figure 9 below):

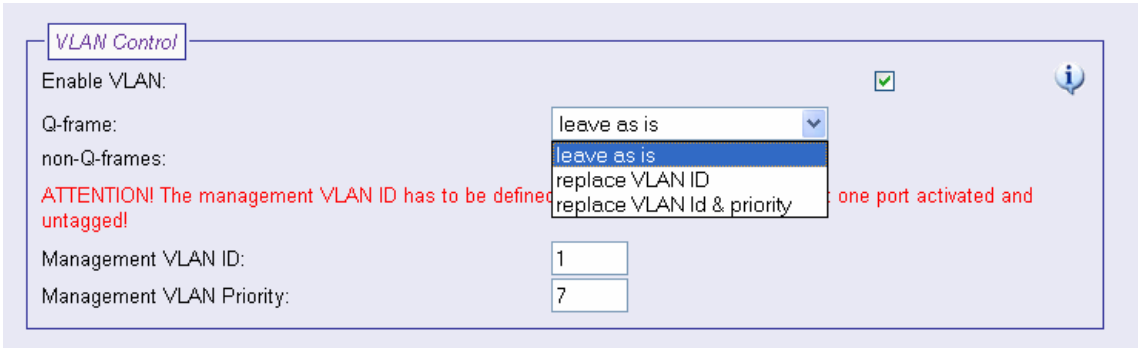


Figure 9. 1800 SW VLAN Control , Q-frame menu options

- *incoming non-Q frames* can be handled as follows (see figure 10):

- a default Q-tag can be inserted
- the priority inside the tag is preserved (this if the VLAN ID is zero but a priority value is set)
- they can be dropped (this also for tags in which the VLAN ID is zero)

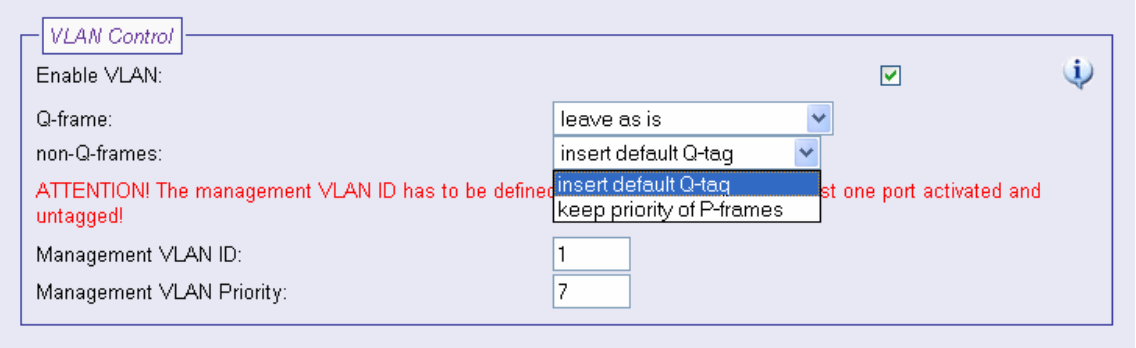


Figure 10. 1800 SW VLAN Control , non-Q-frame menu options

This can be done with the 'non-Q frames' selection box, with the exception of the framesdropping, which is set by ticking the checkboxes of the 'Drop non-Q-frames' row in the VLAN Port Control pane (see figure 11 below).
The ingress rules are defined per port, in the VLAN Port Control pane. There, any port can be configured to drop non-Q-frames (arrow in figure 11). If set, this has prevalence over tag insertion or modification.

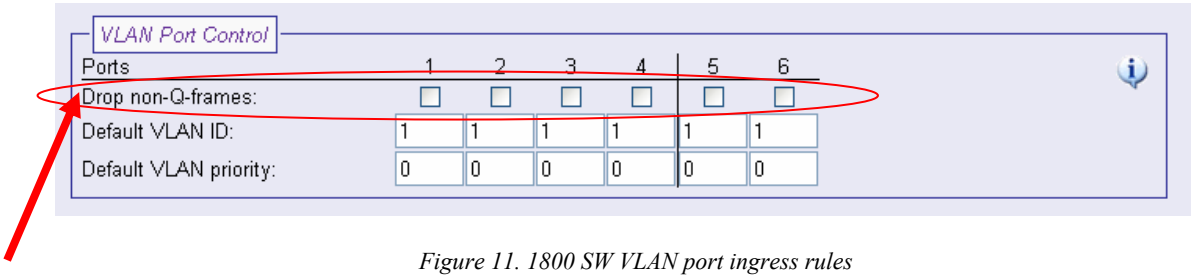


Figure 11. 1800 SW VLAN port ingress rules

Settings example

With VLANs enabled, a port connected to another switch (a non-edge port) would generally be set to:

- drop non-Q-frames (ingress, per port),
- do not untag Q-frames (egress, per port, per VLAN)

An edge device generally does not handle received Q-tags or send such tags. However, at the switch input port, a Q-tag may be inserted holding a VLAN ID and priority assigned to the device according to the ingress rules defined in the VLAN Port Control pane, so VLAN Control settings for an edge port would be:

- untag (egress, per port, per VLAN)
- insert default Q-tag (ingress).

The default Q-tag (per port) is defined on the VLAN Control page, under VLAN Port Control.

Application example

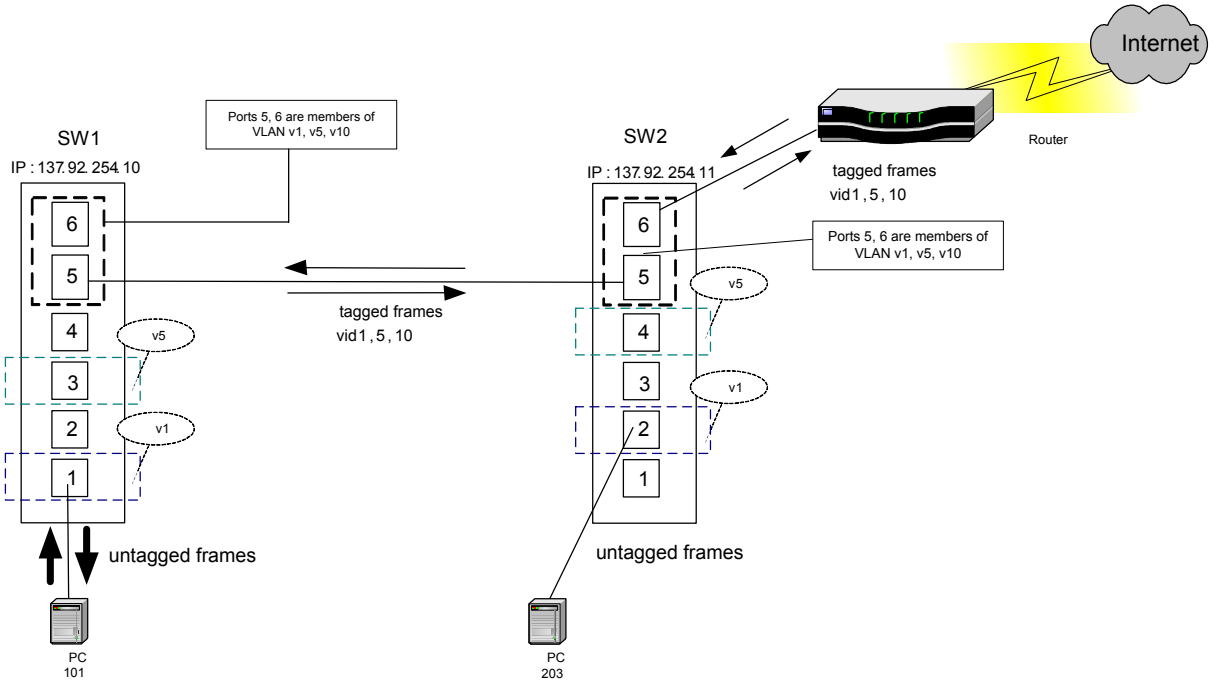


Figure 12. 1800 SW switches with two VLANs

With the switches SW 1 (137.92.254.10) and SW2 (.11) interconnected (see figure 12), traffic between the switches should include all packets that have any business on the other switch; this includes the management packets coming from elsewhere in the network.
Three VLANs (v1, with VLAN ID 1, v5, with VLAN ID 5, and the management VLAN, with ID 10) are indicated; the other ports belong to other VLANs, either local to the switches or extending over other switches. At least one port connected to the network must be a member of VLAN 10.
The two PCs (101, 203) connected to the VLAN 1 ports are transmitting and receiving untagged packets. With VLANs enabled, the ports would be configured as follows:

SW1, port 1; SW2, port 2:
- port ingress: tag with VLAN ID 1 (which would be the most logical choice), priority 0-7
- port egress: untag the VLAN 1 packets going to the device

Both switches, ports 5:
- ingress: Q-frames must be left as they are, non-Q-frames are to be blocked
- egress: here, both ports are member of all three VLANs indicated, so at least the packets tagged with any of the VIDs (1, 5, 10) indicated are transmitted

SW2, port 6:
If any of the VLANs indicated stretch over more than these two switches, at least the packets belonging to those VLANs are to be sent out; in the drawing, this port is a member of all VLANs indicated. In any case, management (VLAN 10) packets must be allowed to travel over the whole network, to allow switch management from anywhere.

6. XSNet 1800 SW Quality of Service (QoS)

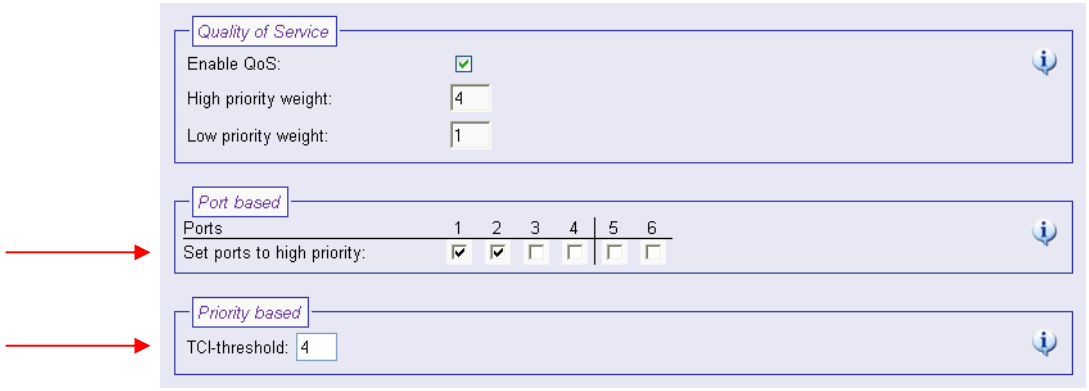


Figure 13. The example has QoS enabled, weights of 4 and 1, ports 1-3 set to high priority, and a TCI-threshold of 4.

Enabling QoS on the 1800 SW instates two priority levels (high/low) and corresponding queues, used in case of network congestion. These levels can be defined as follows:

- Port based: tagged and untagged frames entering a port marked 'high' go to the high-priority queue.
- Priority based: per Q-frame (only priority level 0-7 in tag is important). A TCI lo/hi threshold of 1-7 must be set. Tagged frames with a priority level equal to the TCI-threshold and up go into the high-priority queue.

(TCI = tag control information)

Fulfilling either of these two conditions (see the arrows in figure 13) will get a frame into the high-priority queue.

The H-weight and L-weight entries (values allowed are 0-15), defining how fast the queues are handled, must be set. They are defined as:

- H-weight = *m* (default 4): after handling maximum of *m* high-priority frames, start with low-priority frames
- L-weight = *n* (default 1): after a maximum of *n* low-priority frames, return to handling high-priority frames.

7. XSNet 1800 SNMP management by traps and/or polling

Introduction

To prepare the XSNet 1800 switch for SNMP management, the database documenting the 1800's variables amenable to readout and/or modification must be registered with the program; such SNMP MIB documents are available from our web site.

The System Information pane (on the SNMP HTML page, see figure 14) shows the network/device data specifically made available to the SNMP manager for making the device, its location and service manager(s) traceable.
You will always need to set the *community strings* (names) in the Communities pane to conform to those configured in the SNMP manager. Often, these are 'public', mainly used for the read and trap communities, and 'private' or 'netman', for read-write operations. The manager software may offer additional choices.

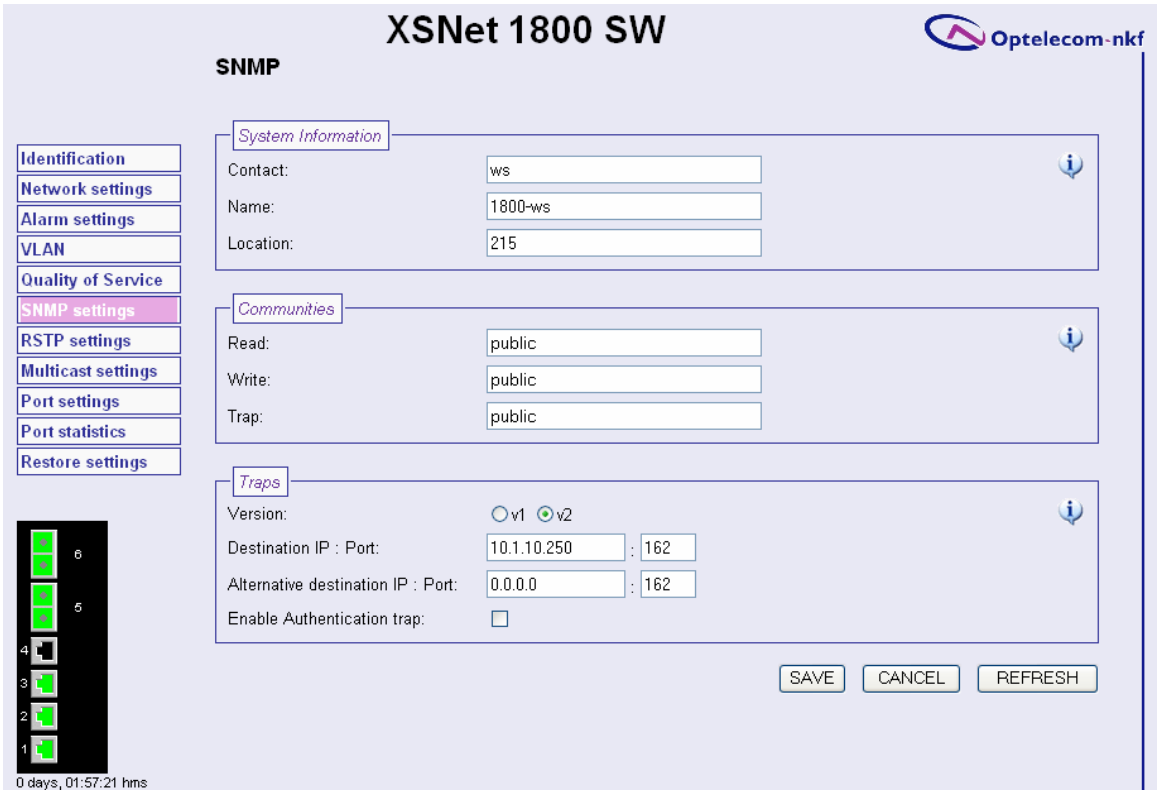


Figure 14. 1800 SW SNMP settings

Traps

Traps generated by the XSNet 1800 SW can be caught by any SNMP manager. Traps can be generated by configuring an alarm level A-N on the Alarm settings page for the available events or variables to be monitored using the SNMP manager program.

In the Traps pane (figure 14), at least the following information must be entered:
- the SNMP version used
- the IP address associated with the manager program, and the destination port (162 is a sensible default).

If desired, an alternative destination IP can be added. It is also possible to add an authentication trap to be able to catch attempts at access using the wrong community string.

The 1800 SW will always generate cold boot and port link up traps (if connected) while booting; this behaviour is fixed through using the SNMP MIB group mgmt:snmp:snmp-Traps:TrapsInfo (in RFC1213-MIB). Link-down/up traps will be sent when a port is disconnected and connected, respectively.

Polling

Depending on facilities offered by the SNMP manager, a number of variables can be read out and in a few cases be edited and set. Many 1800 SW variables are contained in the 'system' and 'interfaces' sections of RFC1213-MIB.
The examples and drawing are taken from the Castle Rock SNMPc manager.

Index	Descr	Type	Mtu	Speed	WLAN Address	AdminStatus	OperStatus	LastChange	InOctets	InUcastPkts	InNUcastPkts	InDiscards	InErrors	InUnknownProtos
1	Port 1	ethernetCsmacd	1518	100000000	00 04 7e 01 08 9e	up	up	0 days 00:00:00.00	466148	4120	104	0	0	UNK
2	Port 2	ethernetCsmacd	1518	100000000	00 04 7e 01 08 9e	up	up	0 days 00:00:00.00	52858	155	6	0	0	UNK
3	Port 3	ethernetCsmacd	1518	0	00 04 7e 01 08 9e	up	down	0 days 00:00:00.00	0	0	0	0	0	UNK
4	Port 4	ethernetCsmacd	1518	100000000	00 04 7e 01 08 9e	up	up	0 days 00:00:00.00	325502	3685	9	0	0	UNK
5	Port 5	ethernetCsmacd	1518	0	00 04 7e 01 08 9e	up	down	0 days 00:00:00.00	0	0	0	0	0	UNK
6	Port 6	ethernetCsmacd	1518	0	00 04 7e 01 08 9e	up	down	0 days 00:00:00.00	0	0	0	0	0	UNK

Figure 15. Part of the 1800 SW port table called up using Castle Rock's SNMPc

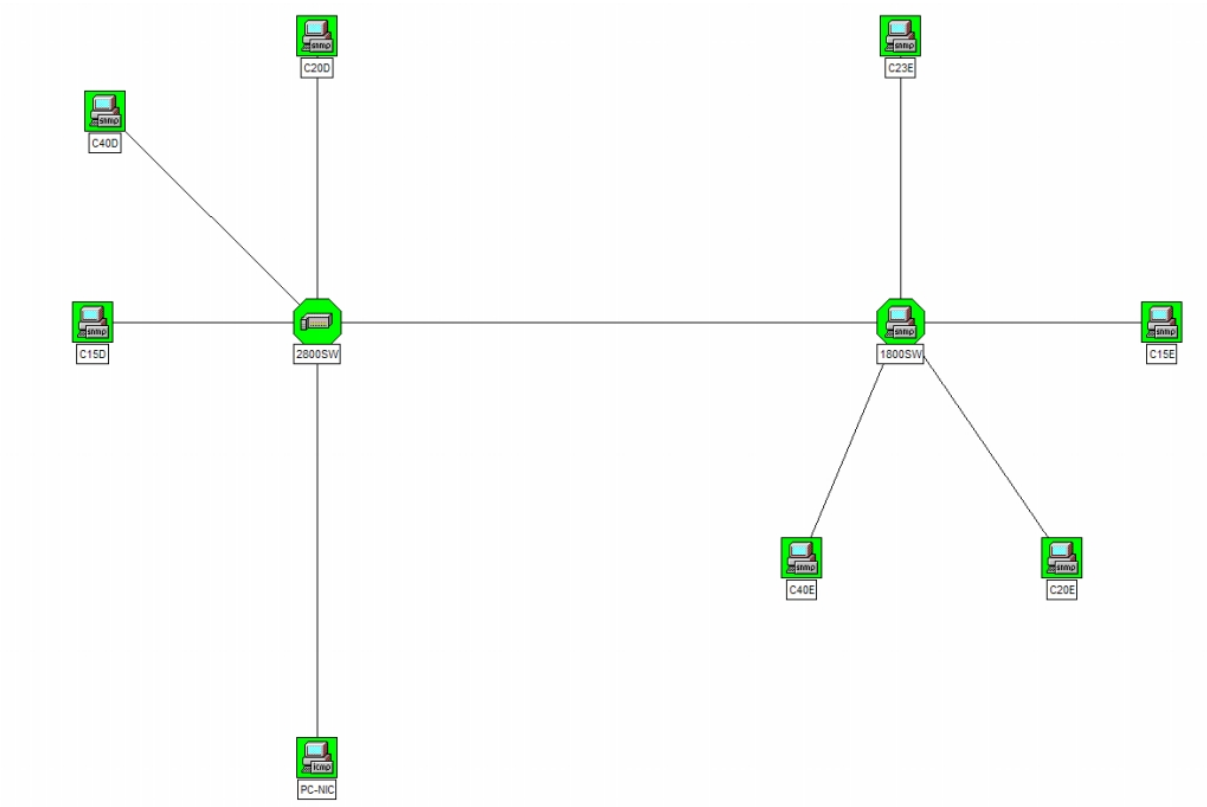


Figure 16. A number of devices centred around two switches connected to a management PC; diagram drawn by hand in Castle Rock's SNMPc.

8. XSNet 1800 SW RSTP

Introduction

Rapid Spanning Tree Protocol (RSTP) is an evolution of the Spanning Tree Protocol (802.1D standard) and provides for faster spanning tree convergence after a topology change.

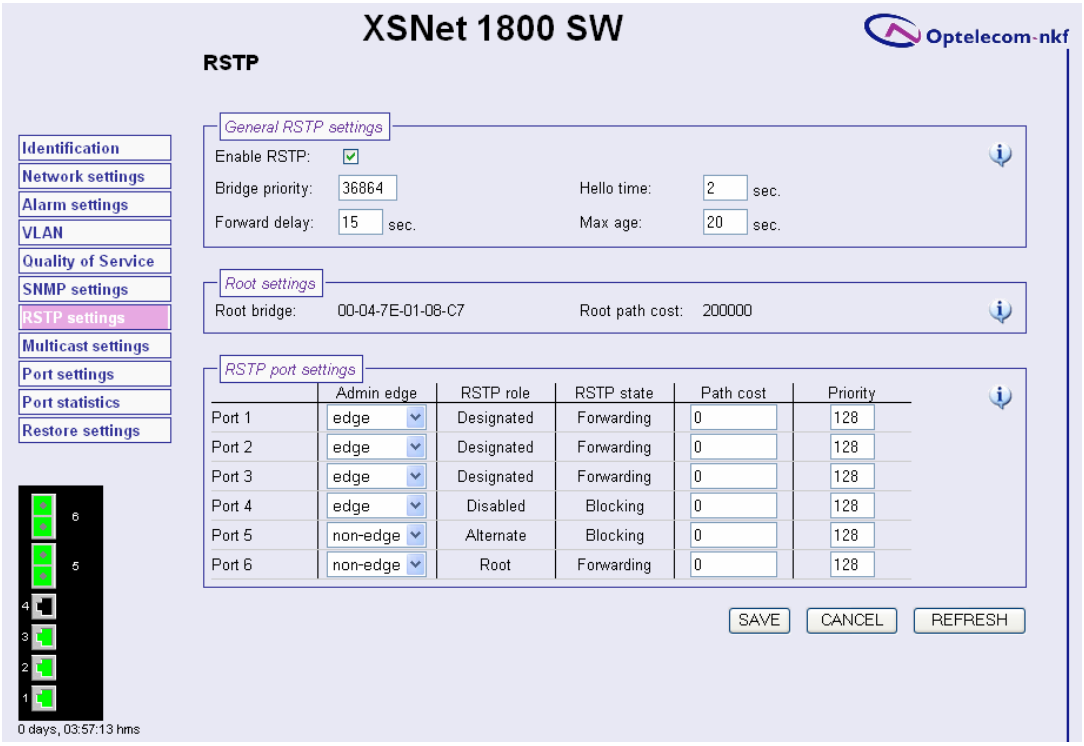


Figure 17. XSNet 1800 SW (R)STP settings

When RSTP is enabled, it ensures that only one path at a time is active between any two nodes in the network. We recommend that you enable RSTP on all switches to ensure that only single active paths in the network exist. The RSTP uses a distributed algorithm to select a bridging device (STP-compliant switch, but it could be a bridge or router) that serves as the root of the spanning tree network. Then it selects a *root port* on each switch (except for the root device) which incurs the lowest path cost when forwarding a packet from that device to the root device. Thirdly, it designates a switch in each LAN which incurs the lowest path cost when forwarding a packet from that LAN to the root device. Viewed from the root device, all ports connecting to (the root ports of) designated switches are assigned as designated ports. After determining the lowest-cost spanning tree, the RSTP enables all root ports and designated ports, and disables all other non-edge ports. Network packets are therefore only forwarded between root ports and designated ports, eliminating any possible network loops.

The 1800 SW and RSTP

The XSNet 1800 SW can use the Rapid Spanning Tree Protocol, which can be enabled or disabled for the switch as a whole, not per VLAN. Port configuration for this protocol works as follows (see the tables in figure 17):

- under General RSTP settings, specify the values for Bridge priority, Forward delay, Hello time and Max age. Generally, the defaults shown will suffice.
- under RSTP port settings (third pane, Admin Edge column), specify for each port whether it is an edge port (connected to an end device), or a non-edge port (such as a backbone port)
- specify path cost and priority.
- **SAVE** the RSTP configuration, after enabling RSTP on the General RSTP settings pane.

Each port 1-6 can be set to be either an edge port or a non-edge port. Edge ports should not be connected to form loops, since rapid spanning-tree will ignore edge ports. Optical ports 5-6 are factory set to be non-edge ports; ports 1-4 are set to edge.

RSTP related terminology is explained in table 1.

By default, RSTP is on unless another connected switch within reach of the algorithm is set to use STP.

RSTP Parameter	Description
Priority (bridge)	The priority value is used to identify the root bridge. The bridge with the lowest value has the highest priority and is selected as root. Enter a value from 1 to 61440.
Max Age	The Max Age value is the number of seconds a bridge waits without receiving Rapid Spanning Tree Protocol configuration messages before attempting a reconfiguration. Enter a time in seconds from 6 to 40.
Hello Time	The Hello time value is the time between the transmissions of Rapid Spanning Tree Protocol configuration messages. Enter a time in seconds from 1 to 10.
Forward Delay time	The forward delay time is the number of seconds a port waits before changing from its Rapid Spanning Tree Protocol learning and listening states to the forwarding status. Enter a time in seconds from 4 to 30.
Port Priority	A port's priority in becoming the root port. The allowed range is between 0-255. Its default setting is 128. The lowest number has the highest priority.
Path Cost	Specifies the path cost of the port. The Switch uses this to determine which ports are the forwarding ports. The lowest numbers assigned are the forwarding ports. The range is between 1 and 65535 and the default values based on IEEE802.1d are: 10Mb/s = 50-600 100Mb/s = 10-60 1000Mb/s = 3-10
EdgePort	Users can enable this option if an interface is attached to a LAN segment that is at the end of a bridged LAN or to an end node. Specifying EdgePorts provides quicker convergence for devices such as workstations or servers, retains the current forwarding database to reduce the amount of frame flooding required to rebuild address tables during reconfiguration events, does not cause the spanning tree to initiate reconfiguration when the interface changes state, and also overcomes other STP-related timeout problems. However, remember that EdgePort should only be enabled for ports connected to an end-node device.
Port Role, Port State	This will display the ports' roles and states as per their settings. See table 2 below for an RSTP/STP state equivalence table.

Table 1. RSTP glossary

STP (802.1D) Port State	RSTP (802.1w) Port State	Port Included in Active Topology?	Port Learning MAC Addresses?
Disabled	Discarding	No	No
Blocking	Discarding	No	No
Listening	Discarding	Yes	No
Learning	Learning	Yes	Yes
Forwarding	Forwarding	Yes	Yes

Table 2. STP and RSTP port states.

With RSTP not enabled, the switch is still compatible with STP switches, but will not actively partake in the STP configuration: the ports are all forwarding (see figure 18).
To force full compatibility with STP-only equipment from the start, you will need additional MX configuration software (set the internal variable Force Version to zero).

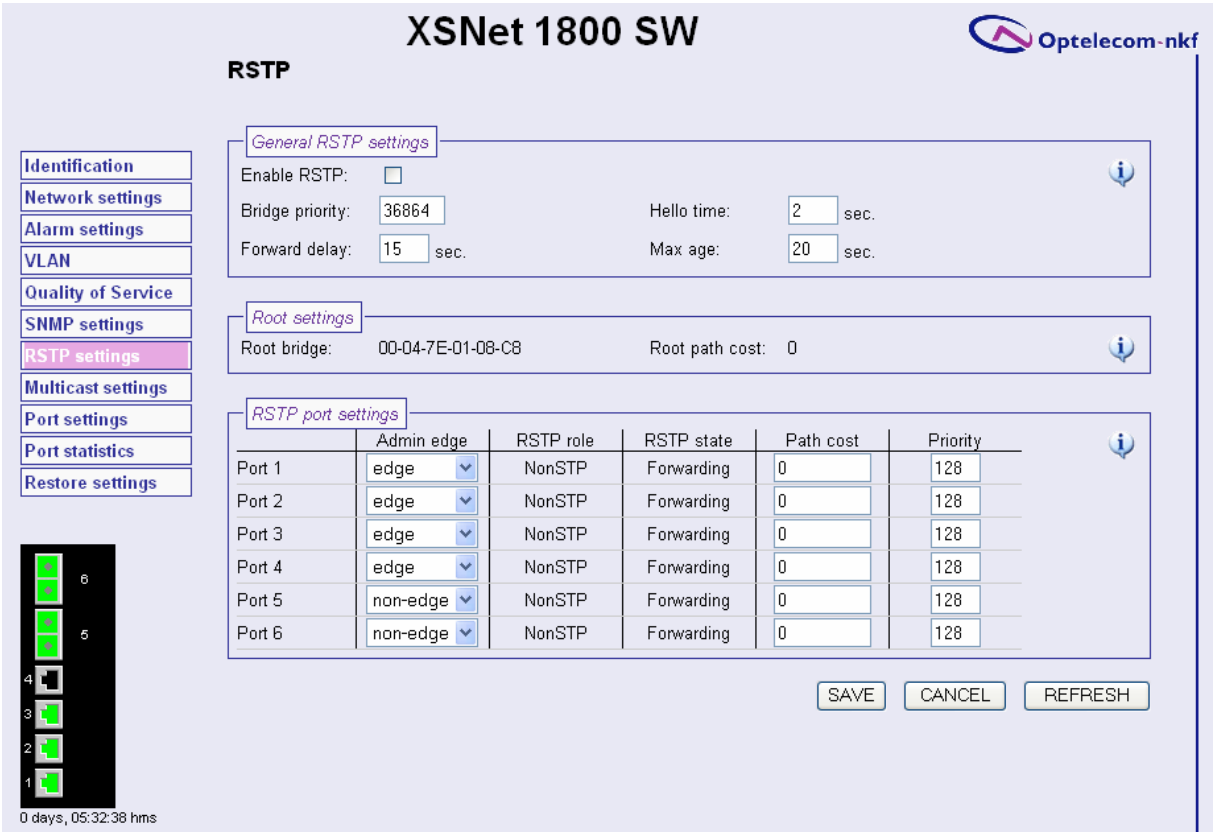


Figure 18. XSNet 1800 SW (R)STP with RSTP not enabled

9. XSNet 1800 multicast settings

The 1800 SW series switches support multicasting, each group of receivers listening to its own source. Inside a switch, regular unicast traffic only passes through the central switch matrix, unaffected by the multicast switch mode. Multicast streams are processed separately, but can share ports with unicast streams.

If multicasting is being used and non-backbone port output is needed, the switch mode needs to be set to 'IGMP enabled' (see figure 19, first entry under ‘Multicast settings’).

On this page, each port can be set to one of the following modes when the switch handles multicasting:

- Transmitter mode: the switch will block all outgoing multicast traffic for this port. Multicast traffic entering the port from outside will pass, so this is a switch entry port for a multicast transmitter.
- Receiver mode: outgoing multicast traffic will be allowed to pass, incoming multicast traffic is blocked.
- Backbone port (all multicast): all multicast traffic will internally be forwarded to and appear on the port, irrespective of IGMP queries or IGMP memberships.

On receipt of a leave message, a port will either (1) if it is an non-edge port, ignore it because still other clients may have subscribed themselves to that particular multicast stream, or (2) if it is an edge port (such as in an end-node device), be disabled for this stream.

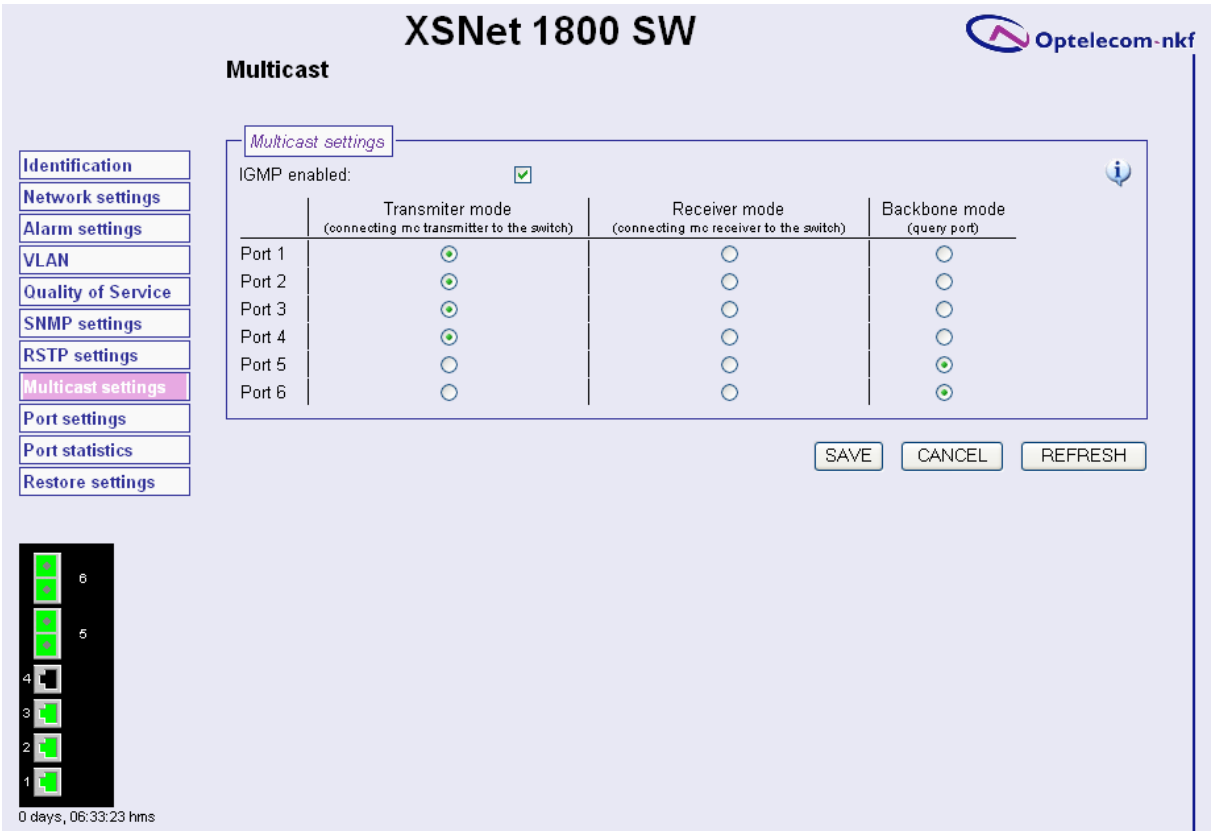


Figure 19. XSNet 1800 SW multicast settings

10. XSNet 1800 SW Port Settings

While in a network, enabled ports in the 1800 SW will have to use a link mode compatible with ports of connected devices. This can be done by selecting auto-negotiation (see the 'link mode' column in the table below) or by setting duplex/half duplex and link speed per port manually. The negotiation results appear in the speed, duplex and pause (the switch is able to send and receive pause frames) columns. If auto-negotiation is used, enabling, sending and receiving of pause frames is automatic.
Note however that the high-speed ports 5 and 6 only offer auto-negotiation or, if this is set to off, the fixed setting 100 Mbit full duplex.

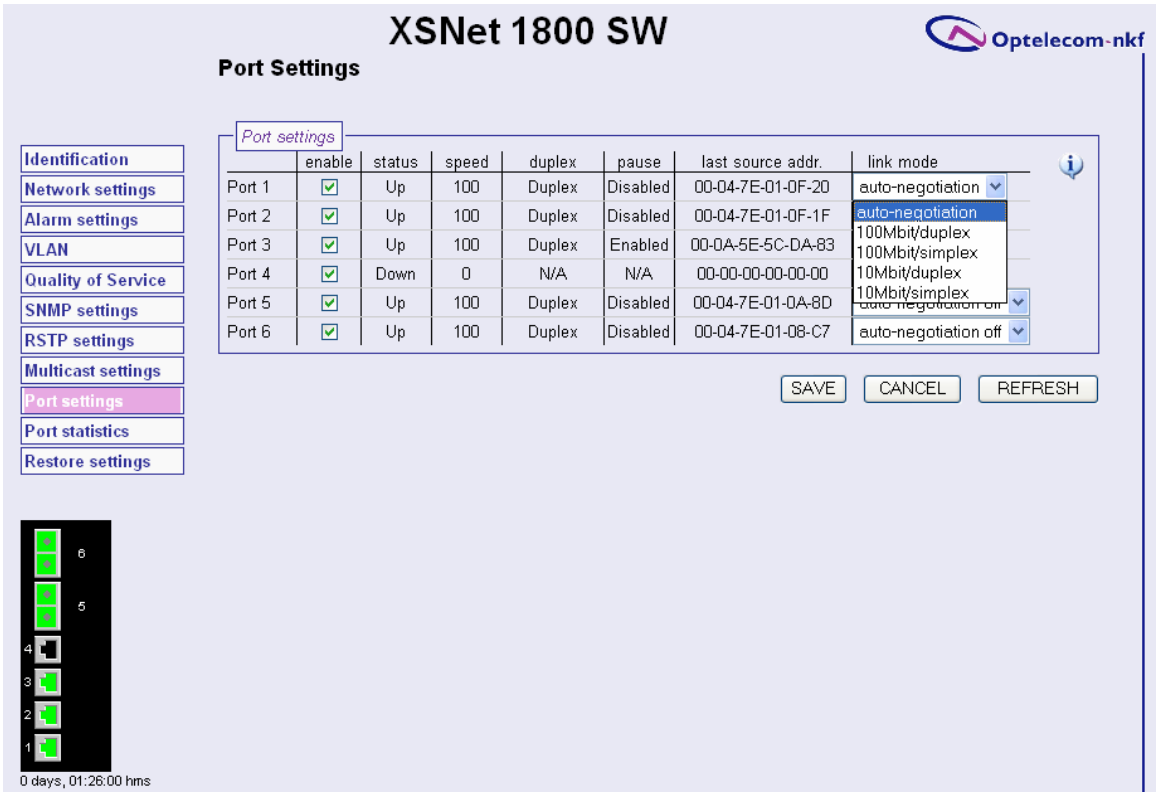


Figure 20. XSNet 1800 SW port/link settings

11. XSNet 1800 SW port statistics

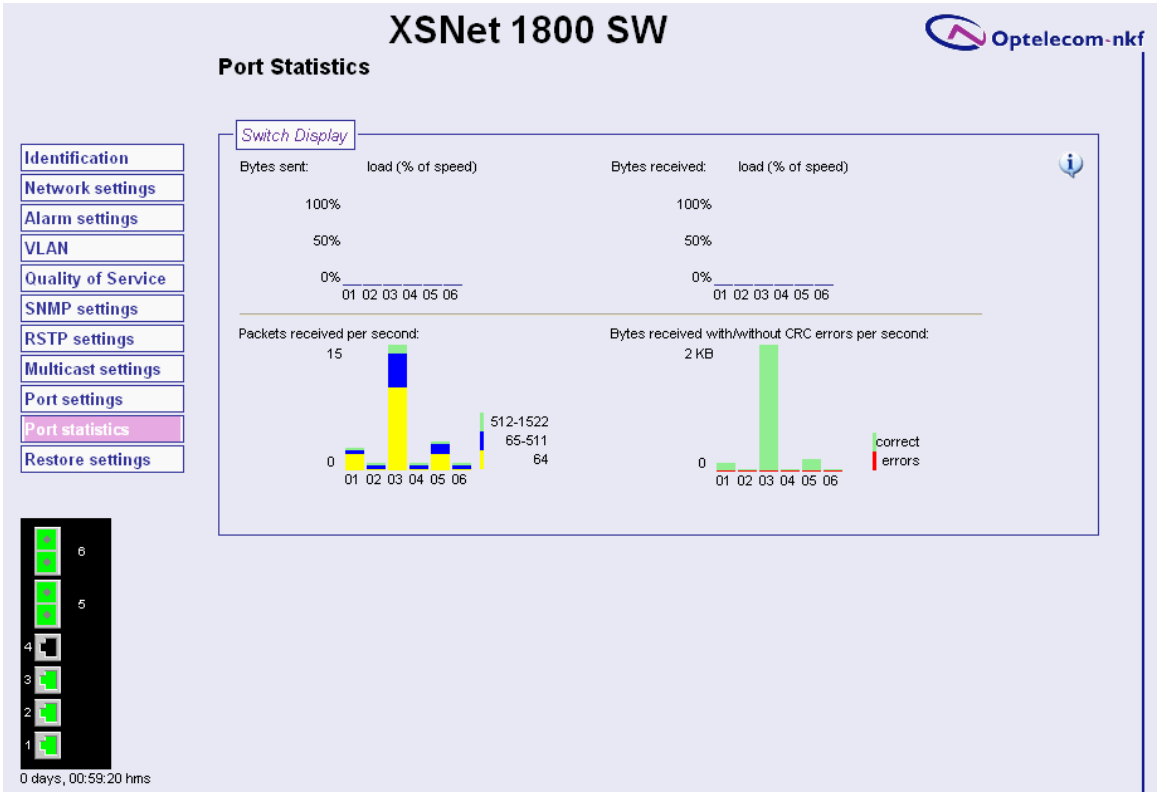


Figure 21. XSNet 1800 SW port statistics

The 1800 SW port loads are represented in figure 21. Transmit and receive port loads are shown in terms of maximum loads (per port) in the upper two graphs, while received packet size and error statistics are depicted in the lower two.

12. XSNet 1800 Reboot and restore

From this page (figure 22), the 1800 SW can be rebooted, either keeping its settings, only keeping its network settings, or restoring all factory defaults, including its network settings:

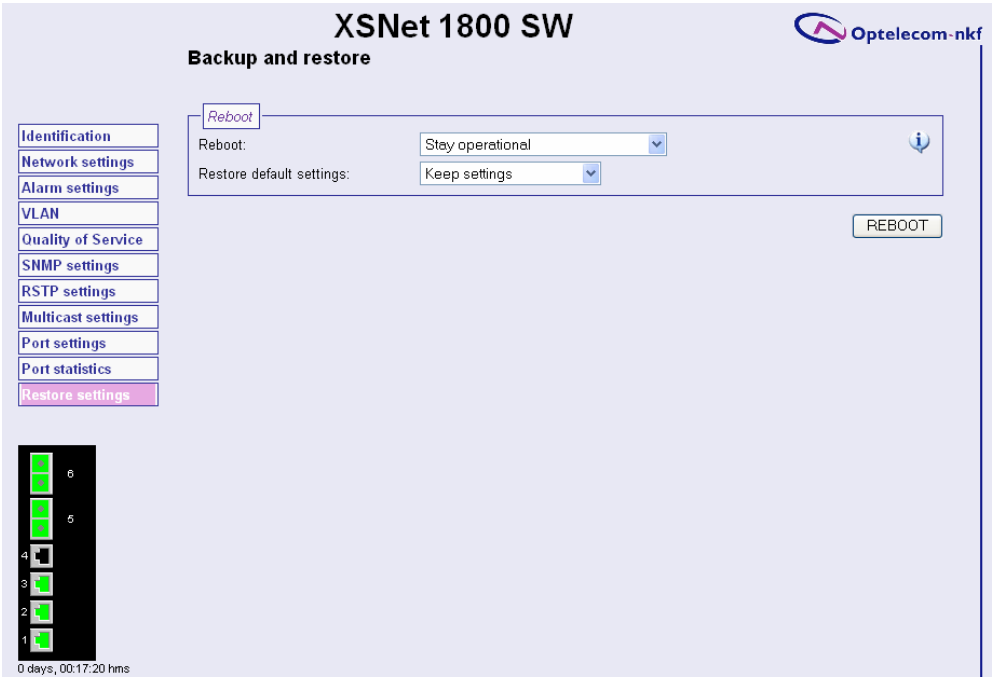


Figure 22. XSNet 1800 SW Rebooting and restoring settings

- in the field marked 'Reboot' (figure 23), the 'Stay operational' option does exactly what it says: the unit will continue to operate even if the **REBOOT** button is activated (the similar button on the Network page however always makes the switch reboot).

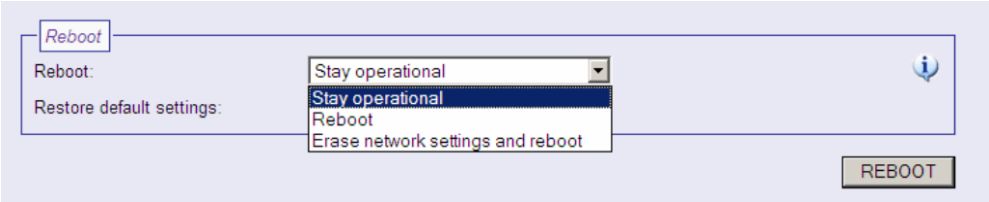


Figure 23. XSNet 1800 SW Reboot options

- with the option 'Reboot', the switch will retain all its settings when rebooting with the option 'Keep settings' under 'Restore default settings' (figure 24). This can for instance be used after changing network settings. However, in the latter case, rebooting is best done from the Network page. The other option 'Restore factory defaults', should be used judiciously.

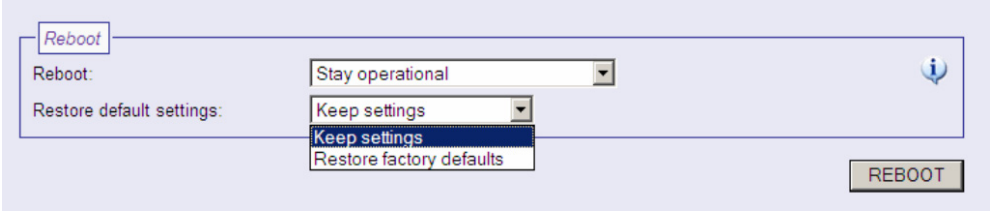


Figure 24. XSNet 1800 SW Reboot options

- 'Erase network settings and reboot' resets the network settings to their default values

Overview of reboot/restore:

'Reboot option'	**'Restore default settings' option**	**Effect on reboot**
stay operational	any setting	will do nothing
reboot	keep settings	reboot the switch without changing values
reboot	restore factory defaults	resets all user values except network settings
erase network settings and reboot	keep settings	network settings reset
erase network settings and reboot	restore factory defaults	full reset

13. Technical specifications

	XSNet 1800 SW		
	1800 /SM-10, BiDi	***1800 /SM-60, /CWDM-λ***	***1800 /MM***
Optical			
Optical ports	2 x 100 BASE-FX		
Output wavelength	1310 nm, or 1310/1490	1550, or CWDM	850 nm
Laser type	On request (SFP package dependent)		
Receiver PIN	On request (SFP package dependent)		
Ribre type	2x2x SM or 2x1x SM (BiDi)	2x2x SM	2x2x MM
Housing	SFP (MSA compliant)		
Optical span	10 km	60 km	> 2 km
Min. fibre length	2 m	2m or >10 km (CWDM)	2 m
Performance			
Address table size	4k entries		
Switching method	store and forward		
Switching fabric	non- blocking		
Ethernet I/Os			
Number of ports	6		
10/100Base-TX 802.3u	4		
100Base-FX	2		
Full-duplex 802.3x	yes		
Standards			
IEEE 802.3	10BASE-T		
IEEE 802.3a,b	100BASE-FX		
IEEE 802.3u	100BASE-TX		
IEEE 802.3x	Full-duplex operation		
IEEE 802.1d	Spanning Tree Protocol		
IEEE 802.1d/t/w/z	Rapid Spanning Tree Protocol		
RFC 2236	IGMP v2		
Powering			
Power consumption	< 6 W		
Supply current	0.6 A		
Rack-mount units	MC 1x power supply cabinets		
Stand-alone units (/SA)	11 to 19 Vdc (PSA 12 DC/25) or PSR 12 DC		
Management			
LED status indicators			
DC LED	power- on indicator OK = GREEN		
Sync port 5, 6	link = GREEN; link activity = GREEN blinking ; no link = off		
LED port 1 t/m 4	10 Mb = YELLOW ; 100 Mb = GREEN; blink is activity		
network management	SNM™ compatible / out-of-band MX/IP™ inband		
Environmental and safety			
Operating temperature	-40 to + 74°C		
Relative humidity	< 95 % (no condensation)		
MTBF	> 100,000 h		
General safety	IEC/EN 60950-1		
UL recognition file	E242498		
Laser safety	IEC 60825-1, IEC 60825-2		
EMC emission	EN 55022 (class B), FCC 47 CFR 15 (class B)		
EMC immunity	EN 55024, EN 50130-4, EN 61000-6-2		
Mechanical			
Optical connectors	duplex LC		
Network connectors	RJ45 (8x)		
Dimensions	128 mm x 34 mm x 190 mm (7TE)		
Weight (approx.)	900 gram		
Housing	rack-mount or stand-alone		

14. Safety, EMC and ESD Information

General

The safety information contained in this section, and on other pages of this manual, must be observed whenever this unit is operated, serviced, or repaired. Failure to comply with any precaution, warning, or instruction noted in the manual is in violation of the standards of design, manufacture, and intended use of the unit.

Installation, adjustment, maintenance and repair of this equipment are to be performed by trained personnel aware of the hazards involved. For correct and safe use of the equipment and in order to keep the equipment in a safe condition, it is essential that both operating and servicing personnel follow standard safety procedures in addition to the safety precautions and warnings specified in this manual, and that this unit be installed in locations accessible to trained service personnel only.

Optelecom-NKF assumes no liability for the customer's failure to comply with any of these safety requirements.

UL/IEC/EN 60950-1: General safety requirements

The equipment described in this manual has been designed and tested according to the UL/IEC/EN 60950-1 safety requirements.

If there is any doubt regarding the safety of the equipment, do not put it into operation. This might be the case when the equipment shows physical damage or is stressed beyond tolerable limits (e.g. during storage and transportation).

Before opening the equipment, disconnect it from all power sources. The equipment must be powered by a SELV*) power supply.

When this unit is operated in extremely elevated temperature conditions, it is possible for internal and external metal surfaces to become extremely hot.

EMC

The equipment has been tested and found to meet the CE-regulations relating to EMC, and complies with the limits for a Class B device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against interference to radio communications in any installation. The equipment generates, uses and can radiate radio frequency energy; improper use or special circumstances may cause interference to other equipment or a performance decrease due to interference radiated by other equipment. In such cases, the user will have to take appropriate measures to reduce such interactions between this and other equipment.

Any interruption of the shielding inside or outside the equipment could cause the equipment to be more prone to fail EMC requirements.

Non-video signal lines must use appropriate shielded CAT5 cabling (S-FTP), or at least an equivalent.

If system components, such as cabling (e.g. coaxial cable, data/audio/cc wiring) and/or the units, are used outdoors, ensure that ***all*** electrically connected components are carefully earthed and protected against surges (high voltage transients caused by switching or lightning).

ESD

Electrostatic discharge (ESD) can damage or destroy electronic components. Proper precautions should be taken against ESD when opening the equipment.

*) SELV: conforming to IEC 60950-1, <60V_{DC} output, output voltage galvanically isolated from mains. All power supplies or power supply cabinets available from Optelecom-NKF comply with these SELV requirements